

**ABSTRACT**

**LOGARITHMIC ARITHMETIC SYSTEM**

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A logarithmic arithmetic apparatus for enabling a microprocessor to determine the approximate value of a logarithmic function  $F(x)$  at a value of  $x$  of interest is disclosed.

10 The apparatus includes look up tables for storing and simultaneously accessing values of the function and its derivative for discrete values of  $x$ , an error between the value of the function and the value extrapolated from the derivative for discrete values of  $x$ , and a ratio function for determining the proportion of this error across an interval between two adjacent discrete values of  $x$ . The apparatus is also provided with multipliers and adder stages. The apparatus enables many logarithmic arithmetic functions to be determined accurately without significantly increasing the necessary capacity of the look up tables, and

15 without significantly decreasing the speed of calculation.